We Claim:

1. A transmitter comprising

a plurality of *m* antennas, where *m* greater than one; and

an encoder handling *m* blocks of incoming symbols at a time, each block containing *N* of said incoming symbols, and encoding said *N* blocks of incoming symbols into m streams of symbols, each being applied to a different one of said m antennas, where said encoding involves modulo arithmetic.

2. The transmitter of claim **1** where said encoding follows an orthogonal encoding design.

3. The transmitter of claim **1** where said encoding is FD-DC encoding.

4. The transmitter of claim **1** where said encoding also involves negations and complex conjugations.

5. The transmitter of claim **1** where m=2, and where

in frame k said encoder generates

a stream of symbols, $x_1^k(n)$, n=0, 1, 2, … N-1, that is applied to a first one of said antennas, preceded by a cyclic prefix sequence of symbols $x_1^k(t)$, t= -1, -2, -v, where v equals to symbol memory of channel through which said transmitter communicates with a receiver, where a cyclic prefix sequence is one where $x_1^k(i)$ in the prefix sequence equals $x_1^k(N-i)$ in the succeeding sequence, and

a stream of symbols, $x_2^k(n)$, n=0, 1, 2, … N-1, that is applied to a second one of said antennas, preceded by a cyclic prefix sequence of symbols $x_2^k(t)$, t= -1, -2, -v, and

in frame $k+1$ said encoder generates

a stream of symbols $x_1^{k+1}(t)$ that is equal to $-\bar{x}_2^k((-n)_N)$, that is applied to said first one of said antennas, preceded by a cyclic prefix sequence of symbols $x_1^{k+1}(t)$, t= -1, -2, -v, and

a second stream of symbols $x_2^{k+1}(t)$ that is equal to, $\bar{x}_1^k((-n)$, that is applied to said second one of said antennas, preceded by a cyclic prefix sequence of symbols $x_2^{k+1}(t)$, t= -1, -2, -v.

6. A receiver comprising:

a time-domain to frequency-domain converter responsive to a signal received by an antenna in frames k and k+1, for developing signals $\mathbf{Y}^k$ in frame k and signals $\mathbf{Y}^{k+1}$ in frame k+1;

a linear combiner for creating a first linear combination signal, $\tilde{\mathbf{Y}}^k$, from signals related to $\mathbf{Y}^k$ and $\mathbf{Y}^{k+1}$, and a second linear combination signal, $\tilde{\mathbf{Y}}^{k+1}$, from signals related to $\mathbf{Y}^k$ and $\mathbf{Y}^{k+1}$, where said first linear combination is different from said second linear combination;

an equalizer that pre-multiplies signal $\tilde{\mathbf{Y}}^k$ by a diagonal matrix $\mathbf{W}$ to form signal $\tilde{\mathbf{Z}}^k$, and pre-multiplies signal $\tilde{\mathbf{Y}}^{k+1}$ by said diagonal matrix $\mathbf{W}$ to form signal $\tilde{\mathbf{Z}}^{k+1}$;

a frequency-domain to time-domain converter for converting signals $\tilde{\mathbf{Z}}^k$ and $\tilde{\mathbf{Z}}^{k+1}$ to time-domain signals; and

a slicer responsive to said time domain signals.

7. The receiver of claim **6** where said time-domain to frequency-domain converter implements a Fast Fourier Transform algorithm.

8. The receiver of claim **6** where said frequency-domain to time-domain converter implements an inverse Fast Fourier Transform algorithm.

9. The receiver of claim **6** where said linear combiner, in creating signal $\tilde{\mathbf{Y}}^k$ from component signals related to $\mathbf{Y}^k$ and $\mathbf{Y}^{k+1}$, multiplies at least one of said component signals by a diagonal matrix.

10. The receiver of claim **6** where said linear combiner, in creating signal $\tilde{\mathbf{Y}}^k$ from component signals related to $\mathbf{Y}^k$ and $\mathbf{Y}^{k+1}$, multiplies each of said component signals by a different diagonal matrix.

11. The receiver of claim **6** where said linear combiner, in creating signal $\tilde{\mathbf{Y}}^k$ from component signals related to $\mathbf{Y}^k$ and $\mathbf{Y}^{k+1}$, employs diagonal matrices $\mathbf{\Lambda}_1$ and $\mathbf{\Lambda}_2$ where diagonal matrix $\mathbf{\Lambda}_1$ is related to characteristics of transmission medium between a first antenna of a transmitter of signals received by said receiver, and $\mathbf{\Lambda}_2$ is related to characteristics of transmission medium between a first antenna of a transmitter of signals received by said receiver.

12. The receiver of claim **11** where said linear combiner, in creating signal $\tilde{\mathbf{Y}}^{k+1}$ from component signals related to $\mathbf{Y}^k$ and $\mathbf{Y}^{k+1}$, employs diagonal matrices that are related to said matrices $\mathbf{\Lambda}_1$ and $\mathbf{\Lambda}_2$ through operations taken from a set that includes negations and complex conjugations.

13. The receiver of claim **6** where said linear combiner creates signal $\tilde{\mathbf{Y}}^k = \mathbf{\Lambda}_1^*\mathbf{Y}^k + \mathbf{\Lambda}_2\bar{\mathbf{Y}}^{k+1}$, and signal $\tilde{\mathbf{Y}}^{k+1} = \mathbf{\Lambda}_2^*\mathbf{Y}^k - \mathbf{\Lambda}_1\bar{\mathbf{Y}}^{k+1}$, where $\bar{\mathbf{Y}}^{k+1}$ is a complex conjugate of $\mathbf{Y}^{k+1}$.

14. The receiver of claim **13** where elements of said diagonal matrix **W** are related to matrices $\mathbf{\Lambda}_1$ and $\mathbf{\Lambda}_2$.

15. The receiver of claim **13** where said diagonal matrix **W** has elements

$\mathbf{W}(i,i)=\dfrac{1}{\tilde{\Lambda}(i,i)+\dfrac{1}{SNR}}$, where $\tilde{\Lambda}(i,i)=\Lambda_1(i,i)\Lambda_1^*(i,i)+\Lambda_2(i,i)\Lambda_2^*(i,i)$, and $(\cdot)^*$ represents a complex conjugate operation, and *SNR* is a computed value.

16. A receiver comprising:

a time-domain to frequency-domain converter responsive to a signal received by an antenna in frames *k*, *k*+1, … *k*+m, where m is a selected integer greater than 0, for developing signals $\mathbf{Y}^k$, $\mathbf{Y}^{k+1}$, … $\mathbf{Y}^{k+m}$, in frames *k*, *k*+1, …*k*+m, respectively;

a linear combiner for creating signals $\tilde{\mathbf{Y}}^k$, $\tilde{\mathbf{Y}}^{k+1}$, … $\tilde{\mathbf{Y}}^{k+m}$ from linear combinations of signals related to $\mathbf{Y}^k$, $\mathbf{Y}^{k+1}$, … $\mathbf{Y}^{k+m}$;

an equalizer that pre-multiplies each signal $\tilde{\mathbf{Y}}^j$, *j*=*k*, *k*+1, … *k*+*m* by a diagonal matrix **W** to form signals $\tilde{\mathbf{Z}}^j$, *j*=*k*, *k*+1, … *k*+*m;*

a frequency-domain to time-domain converter for converting signals $\tilde{\mathbf{Z}}^j$ to time-domain signals; and

a slicer responsive to said time domain signals.

17. The receiver of claim **17** where said signals related to signals $\mathbf{Y}^k$, $\mathbf{Y}^{k+1}$, … $\mathbf{Y}^{k+m}$ are related to said signals $\mathbf{Y}^k$, $\mathbf{Y}^{k+1}$, … $\mathbf{Y}^{k+m}$ through operations from a set that includes negations and complex conjugations.

18. A receiver comprising:

p antennas, where *p* is an integer greater than 1;

a time-domain to frequency-domain converter responsive to a signal received by each of said antennas in frames *k*, *k*+1, … *k*+m, where m is a selected integer greater than 0, for developing signals $\mathbf{Y}_j^k$, $\mathbf{Y}_j^{k+1}$, … $\mathbf{Y}_j^{k+m}$, in frames *k*, *k*+1, …*k*+m, respectively, where subscript j identifies a *j*th antennas of said *p* antennas;

a linear combiner for creating groups of signals $\tilde{\mathbf{Y}}_n^k$, $\tilde{\mathbf{Y}}_n^{k+1}$, … $\tilde{\mathbf{Y}}_n^{k+m}$ for each value of subscript *j*=1, 2, … *p*, from linear combinations of signals related to said signals $\tilde{\mathbf{Y}}_n^k$,

$\tilde{\mathbf{Y}}_n^{k+1}, \ldots \tilde{\mathbf{Y}}_n^{k+m}$, when n is an index designating a transmitting unit that supplies signals to said p antennas;

an equalizer that pre-multiplies each signal $\tilde{\mathbf{Y}}_n^q$, $q=k, k+1, \ldots k+m$ by a diagonal matrix $\mathbf{W}$ to form signals $\tilde{\mathbf{Z}}_n^q$, $q=k, k+1, \ldots k+m;$

a frequency-domain to time-domain converter for converting signals $\tilde{\mathbf{Z}}_n^q$ to time-domain signals; and

a slicer responsive to said time domain signals.

19. The receiver of claim **18** where p=2, and where said linear combiner obtains signals $\tilde{\mathbf{Y}}_n^k$ and $\tilde{\mathbf{Y}}_n^{k+1}$ by computing

$$\begin{bmatrix} \hat{\mathbf{Y}}_1^k \\ \hat{\mathbf{Y}}_2^k \end{bmatrix} = \begin{bmatrix} \mathbf{I} & -\mathbf{\Lambda}_{2-1}\mathbf{\Lambda}_{1-2}^{-1} \\ -\mathbf{\Lambda}_{2-2}\mathbf{\Lambda}_{1-1}^{-1} & \mathbf{I} \end{bmatrix} \begin{bmatrix} \mathbf{Y}_1^k \\ \mathbf{Y}_2^k \end{bmatrix}$$

where $\hat{\mathbf{Y}}_1^k$ represents signal received at said receiver, in frame k, from transmitting unit 1, and $\hat{\mathbf{Y}}_2^k$ represents signal received at said receiver, in frame k, from transmitting unit 1, $\mathbf{\Lambda}_{1-1}$ is a diagonal matrix representing transmission medium between transmitting unit 1 and a first one of said two antennas, $\mathbf{\Lambda}_{2-1}$ is a diagonal matrix representing transmission medium between transmitting unit 2 and said first one of said two antennas $\mathbf{\Lambda}_{1-2}^{-1}$ is a diagonal matrix representing transmission medium between said transmitting unit 1 and a second one of said two antennas $\mathbf{\Lambda}_{2-2}$ is a diagonal matrix representing transmission medium between said transmitting unit 1 and said second one of said two antennas.

20. A method carried out in a receiver for decoding received frame signals of a unit that transmits over p antennas, comprising the steps of:

converting each received frame signal to frequency domain;

in groups of p consecutive converted frame signals, combining said converted frame signals to form p intermediate signals;

multiplying said intermediate signals by values related to transfer characteristics between said p antennas and said receiver, to obtain thereby equalized signals;

converting said equalized signals to time domain, to obtain time domain estimate signals; and

carrying out a decision regarding information symbols transmitted by said unit, based on said estimate signals.

21. The method of claim **20** where said combining is linear combining.

22. The method of claim **20** where said transfer characteristics employed in said step of multiplying are frequency domain characteristics of transmission channel between said p antennas and said receiver.